CLAIMS

1. A method of manufacturing a microcomponent assembly, comprising:

providing first and second microcomponents having respective first and second contact areas and having feature dimensions less than about 50 microns;

forming a junction compound on at least one of the first and second contact areas;

positioning the first and second contact areas adjacent each other on opposing sides of the junction compound; and

activating the junction compound to couple the first and second microcomponents.

2. The method recited in Claim 1 wherein the feature dimensions are less than about 25 microns.

3. The method recited in Claim 1 wherein the junction compound comprises indium.

4. The method recited in Claim 1 wherein activating the junction compound electrically couples the first and second microcomponents.

5. The method recited in Claim 1 wherein the junction compound is formed on both of the first and second contact areas.

6. The method recited in Claim 1 wherein the junction compound is formed by sputtering.

7. The method recited in Claim 1 wherein the junction compound is formed by a method selected from the group consisting of:

electroplating;

chemical vapor deposition (CVD);

plasma enhanced CVD;

physical vapor deposition;

ionized metal plasma deposition; and

atomic layer deposition.

8. The method recited in Claim 1 wherein activating the junction compound comprises heating the junction compound.

9. The method recited in Claim 8 wherein the junction compound is heated by heating the first and second microcomponents in a temperature-controlled process chamber.

10. The method recited in Clam 8 wherein the junction compound is heated by exposing the junction compound to a laser.

11. The method recited in Claim 8 wherein at least one of the first and second microcomponents comprises a heater element proximate the junction compound and the junction compound is heated by operating the heater element.

12. The method recited in Claim 8 wherein the junction compound is heated by thermal energy transferred from a gripping mechanism to the junction compound.

13. The method recited in Claim 1 wherein at least one of the first and second microcomponents is a nanocomponent.

14. The method recited in Claim 1 wherein one of the first and second microcomponents is a substrate.

15. A method of manufacturing a microcomponent assembly, comprising:

providing a substrate having a first contact area;

providing first and second microcomponents each having a second contact area;

forming a junction compound on at least one of the first and second contact areas;

positioning the first and second contact areas adjacent opposing sides of the junction compound; and

activating the junction compound to couple the first and second microcomponents to the substrate.

16. The method recited in Claim 15 wherein the first and second contact areas are positioned before the junction compound is activated.

17. The method recited in Claim 15 wherein a first portion of the junction compound adjacent the second contact area of the first microcomponent is activated before the second contact area of the second microcomponent is positioned adjacent a second portion of the junction compound.

18. A microcomponent assembly, comprising:

first and second microcomponents having respective first and second contact areas; and

a heat-activated junction compound located between the first and second contact areas, thereby coupling the first and second microcomponents.

19. The assembly recited in Claim 18 wherein at least one of the first and second microcomponents is a nanocomponent.

20. The assembly recited in Claim 18 wherein the junction compound comprises indium.

21. A microcomponent assembly, comprising:

a first microcomponent having a first contact area and a connecting member;

a second microcomponent having a second contact area and an opening configured to receive the connecting member;

a junction compound located between the first and second contact areas, thereby coupling the first and second microcomponents.

22. The assembly recited in Claim 21 wherein the second microcomponent includes a retaining surface adjacent the opening and the connecting member includes a barbed member configured to engage the retaining surface.

23. The assembly recited in Claim 21 wherein the junction compound comprises indium.

24. The assembly recited in Claim 21 wherein the junction compound comprises a heat-activated compound.

25. The assembly recited in Claim 21 wherein the first and second microcomponents comprise electrical conductors and the junction compound electrically couples the electrical conductors.

26. The assembly recited in Claim 21 wherein at least one of the first and second microcomponents includes a heating element proximate the junction compound.

27. The assembly recited in Claim 21 wherein at least one of the first and second microcomponents is a nanocomponent.